

only to be interpreted accurately in the light of a comprehensive knowledge of the physiology of vision.

We have the profoundest respect for the work which Sir William Abney has done upon the subject, and every competent critic will endorse the opinion of Lord Rayleigh, quoted by Lord Hamilton of Dalzell, that the Board of Trade could not be wrong in following his advice. How is it to be explained, then, that his opinion, endorsed by other competent men of science, is not accepted as final? We think that it is largely due to the difficulty, or rather impossibility, of conveying to laymen any adequate conception of the peculiarities of vision of the colour-blind. The difficulty is enhanced by the terminology and phraseology adopted by the expert, who almost invariably speaks, as it were, in the language of the theory of colour-vision which he personally affects. Thus, Sir William Abney describes a man in terms of the Young-Helmholtz theory as *red-blind*, whilst Dr. Rivers, agreeing entirely with the facts of the colour-vision of the individual, describes him as *red-green-blind*, and would doubtless prefer to avoid all ambiguity by calling him *scoterythrous*. Every statement which either might make in endeavouring to convey some idea of the visual perceptions of a colour-blind individual to one who has had no training in the physiology of the senses might be implicitly relied on for accuracy when rightly interpreted, but the probabilities of correct interpretation are exceedingly small, if, indeed, the whole statement is not regarded as a meaningless jargon.

Further, the layman fails wholly to understand why recodite tests, such, for example, as that with simultaneous contrast colours, should be imposed upon the examinee. He can comprehend "practical" tests on board ship, such as that to which Mr. Trattles submitted. It would surprise him greatly to be told that under favourable atmospheric conditions the expert would fully expect a colour-blind person to pick up lights with unfailing accuracy.

The Trattles case will have served an invaluable purpose if, as must inevitably be, it focusses public opinion upon the glaring anomalies of the examination in colour-vision of candidates by the Board of Trade. It appears to us to be imperative that all the conditions should be re-investigated by a competent body, either a carefully selected Royal Commission or a committee of the Royal Society upon which physiologists and ophthalmologists who have devoted special attention to the subject are adequately represented. Among the duties of such a committee would be:—

(1) Re-investigation of the tests for colour-blindness with the view of the adoption of methods less open to attack, and, if possible, of a simpler nature.

(2) Re-organisation of the examinations and of the boards of examiners.

We have no doubt that it would be possible so to revise the conditions of the Board of Trade examinations that it would cease to be necessary to have recourse to a court of law for adjudication on the results of a purely scientific question.

NATURE PHOTOGRAPHY.¹

THE object of Mr. Bedford's book is to encourage the pursuit of nature photography among those who cannot afford either the time or expense to undertake very advanced work in this direction. The author rightly points out that there are great advantages in this method of studying nature over the older method of collecting, and that the study of natural history by means of photography may be taken up by those

¹ "Nature Photography for Beginners." By E. J. Bedford. Pp. xiv + 168. (London: J. M. Dent and Sons, Ltd., 1909.) Price 7s. 6d. net.

whose time and means are strictly limited. The first part of the book deals with the apparatus required. A detailed description is left to text-books on photography; some knowledge of cameras and photographic methods is assumed, and the author confines himself to suggestions and to an account of the particular kinds of apparatus which he himself has found serviceable. On the whole, this part of the book should be valuable to a beginner taking up the subject for the first time, but one feels that in some parts space is wasted in describing processes of which a sufficient account is given in every book on photography, and other parts might with advantage be made more full, for in places the reader is left with no clear idea of the nature of the instrument or process recommended. Rough estimates of cost might also have been included; several times we are told that the choice must be decided by the possible outlay, but no actual estimates of expense are given.

The second part of the book deals with the actual photography of living objects. In the chapter on choice of subjects, the author very rightly empha-



Red Admiral Butterfly (wings expanded). From "Nature Photography for Beginners."

sises the fact that a connected series of photographs of one subject or group of subjects is of much greater interest and value than an indiscriminate collection of pictures of isolated things. This is illustrated in the book by the series of plates (Figs. 69-76) showing the early life of a young cuckoo. We regret that the chapter was not extended somewhat, at least so far as to emphasise the value of photographic records of objects which cannot easily be collected or preserved in their natural condition, such as fungi, insect larvæ, or fruits. As an illustration of the excellent results that may follow from the patient collection of photographs of such things, one may mention Connold's useful book on "British Oak Galls."

The chapters on how to observe and photograph the commoner birds and their nests take the form of a conversation, or rather discourse, to an imaginary novice during a series of birds'-nesting excursions. This style of writing is very irritating, as are the frequent references to the pleasures of tea in the country, and these chapters might lead one who had

never searched for nests, to believe that one could be found in every bush in which it was sought. It is to be regretted that the author did not put his evidently considerable knowledge of nesting-habits into different form. The succeeding chapter, on curious nesting-places, where the author's experience is told straightforwardly, is much better. The concluding chapters, on photographing animals and flowers and on protective colouration, are so sketchy as to be of little practical use, and we note some mistakes, e.g. the statement on p. 161 about the cause of colour differences in moths probably has no foundation.

The style of the whole book is colloquial, and sometimes marred by not very successful attempts at wit.

The book is illustrated by a number of very pretty photographs, which are distinctly good, but not of the striking character made familiar by some other nature-photography works. Nearly all are stereoscopic, and a stereoscope is supplied with the book which adds considerably to their usefulness. Unfortunately, the stereoscope makes the texture of the process-block unpleasantly conspicuous. Although the photographs are not especially striking, they illustrate well the kind of work which an amateur who is limited in time or means may hope to produce.

THE NEW COMET (1910a).

THE comet discovered near Johannesburg on January 16, as announced in last week's NATURE, has justified the opinion then expressed as to its becoming a brilliant object in our evening skies. From many parts of the civilised world we hear of crowds gathering to watch the rare phenomenon, and the daily Press, despite the General Election excitement, has devoted considerable space to the description of the "Daylight Comet."

Apparently the comet was first seen by some miners on January 16, and reported to Mr. Innes, of the Transvaal Observatory, Johannesburg. Messrs. Worsell and Innes made the first measurement of its position at 19h. 29.2m. G.M.T. January 16, that is, at 9.29 a.m. on January 17 local standard time, when the sun would be well above the horizon. The measures were continued until January 17, oh. 8.6m. (Johannesburg M.T.), that is, midday, and they showed that the comet was rapidly approaching the sun, the apparent movement per hour being +42s. in R.A. and +65' in declination.

Mr. Innes described the comet as having a head 5' in diameter, and a well-developed tail; in a later message the latter was stated to be 1° long, fan-shaped, and visible to the naked eye. This observation emphasises the exceptional brilliance of the comet and the purity of the Transvaal atmosphere, for at the time of observation the comet was within 4½° of the sun and west of it.

The apparent motion was so rapid that by the time the discovery was announced here the comet had passed to the east of the sun, and was therefore to be seen at or after sunset instead of before or at sunrise. The Cambridge Observatory appears to have been the most fortunately situated of English observatories, for the sky was clear enough on January 19 to warrant an attack in force, and Mr. Hubrecht was, according to Saturday's *Daily Mail*, fortunate enough to find the comet straight away. Mr. Hinks thereupon secured a measure of the position, and saw a nucleus as bright as Mercury, and a tail 2° long; on Thursday, January 20, the nucleus was seen to be brighter and the tail further developed.

According to a Central News correspondent, the comet was seen, in full daylight, at the Milan Observatory, but no tail was seen. The observations

of the tail vary considerably in their estimates of its length, but this is to be expected, for, obviously, the prominence of such a filmy structure in daylight or twilight will vary greatly with the purity of the atmosphere.

At Oxford, Prof. Turner found the comet quite a conspicuous object, in field-glasses, at 5 p.m. on January 20, and could see it quite easily with the naked eye; he made his observations from the Robinson Tower of New College.

On Friday, January 21, the Cambridge observers were again favoured, and, according to the *Times*, Mr. Hinks found the comet to be considerably brighter than on the preceding day, and to have a fine stellar nucleus with the surrounding envelopes well developed. Prof. Dyson, at the Royal Observatory, Edinburgh, also saw the nucleus. The same day, Mr. J. H. Elgie, observing at Leeds, saw the comet at 5 p.m., and describes it as "weirdly magnificent," having a tail 8° long. The nucleus, he estimated, was as bright as Mars at the recent opposition, and the tail was curved, with the concave side towards Venus; the outer edge was then well defined, but further observations, on Saturday, showed it to be much more diffused. The Rev. F. J. Jervis-Smith, writing from Lymington, says that several persons observing there on January 22 thought the tail appeared to flash slightly and continuously, but this phenomenon may have been due to the low position of the object and consequent atmospheric effects.

The lengthy reports in Monday's *Times*, *Daily Mail*, *Chronicle*, &c., show that the comet was well observed during the week-end. On Saturday, January 22, Prof. Turner secured two photographs showing the brighter portions of the tail, and four photographs were taken at the Dunsink Observatory. Dr. Whittaker and his assistants at Dunsink also observed the comet visually, and found that, in addition to the tail, extending upwards to a distance of 8°, where it was lost in a dense cloud, there was a distinct jet, or horn, of light on that side of the head nearest to the horizon. The head of the comet appeared as a dusky-red nucleus surrounded by a nebulous envelope of fainter red, and was as large as, or larger than, Mars. The twin tails were of a bright yellow colour.

Dr. Rambaut observed the comet with the 10-inch and 18-inch telescopes at the Radcliffe Observatory on January 22, and saw it quite well, despite a thick haze. Prof. Dyson also made observations at Edinburgh, and found, at 5.25 p.m., that the head was as bright as Mars and had a nucleus 45" in diameter, whilst the tail extended to a distance of 7°. At Cambridge it was estimated to be 6° long. The orbit computed by Messrs. Stratton and Hubrecht, at Cambridge, shows that the comet passed through perihelion on January 17, at a distance of two million miles from the sun, and will continue to move northwards with diminishing speed.

At the Solar Physics Observatory, South Kensington, and, we understand, at the Royal Observatory, Greenwich, the careful preparations for observing, and the constant attendance of the staff during the hours available for observations, were, until Tuesday evening, rendered nugatory by clouds, or by the persistent smoky haze which, even on Saturday, rendered Venus a faint object, and made quite hopeless the careful search for the comet. But on Tuesday evening observations were secured by Dr. W. J. S. Lockyer, using the 10-inch refractor, and these showed that, at 5.35 p.m., the Kiel position was in error to a slight extent in R.A. and about 2° in declination, the observed place being further south than that indicated by the ephemeris.

In a telegram transmitted by Prof. Pickering to the